

STARTING HEALTH CARE WASTE MANAGEMENT IN MEDICAL INSTITUTIONS

A PRACTICAL APPROACH



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A HEALTHY AND SAFE PHYSICAL ENVIRONMENT

By the year 2015, people in the Region should live in a safer physical environment, with exposure to contaminants hazardous to health at levels not exceeding internationally agreed standards

(Adopted by the WHO Regional Committee for Europe at its forty-eighth session, Copenhagen, September 1998)

Keywords

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A PRACTICAL APPROACH

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Introduction

The disorganized and chaotic management of health care wastes leads, rightly or wrongly, to the public belief that an institution is an unhealthy place and failing in its responsibilities (Photo 1).

Photo 1. Unhygienic waste storage in a medical area:
a breeding site for pathogens



Source: WHO Centre for Environmental Health Activities, Amman.

Every hospital and clinic, no matter what size, is intended to be a place of healing. This is the fundamental purpose of a health care system. The ability of an institution to provide a good standard of health care is undermined if there is a poor standard of hygiene and a high risk of avoidable infection to patients and medical workers. Achieving a good standard of cleanliness in health care institutions is an important component in controlling infection.

Waste produced in medical departments is one of the sources of infection. Its potential to cause infection increases if it is not properly handled and removed regularly from each medical area. It is not the only source of infection but one that can be easily avoided with a little effort and forethought. It is thus surprising that health care institutions in many middle- and lower-income regions have few or no arrangements for the organized collection and disposal of the waste that they produce. Examples of the types of infection that may be present in waste items that are contaminated with body fluids from patients are presented in Table 1.

Table 1. Examples of pathogens in body fluids contaminating health care waste items

Pathogens in body fluids	Type of infection
Blood	
<i>Staphylococcus sp.</i>	Septicaemia
Human immunodeficiency virus (HIV)	Acquired immunodeficiency syndrome (AIDS)
<i>Staphylococcus aureus, Enterobacter, Enterococcus, Klebsiella, Streptococcus sp.</i>	Bacteraemia
<i>Candida albicans</i>	Candidaemia
Hepatitis B and C viruses	Viral hepatitis B and C
Junin, Lassa, Ebola and Marburg viruses	Haemorrhagic fevers
Faeces and /or vomit	
<i>Salmonella, Shigella sp, Vibrio cholerae, helminths</i>	Gastroenteric infections
Hepatitis A virus (faeces only)	Viral hepatitis A
Saliva	
<i>Mycobacterium tuberculosis, measles virus, streptococcus pneumoniae</i>	Respiratory infections
Pus	
<i>Streptococcus sp.</i>	Skin infections

Source: adapted from (2).

This document has been prepared in response to numerous requests for advice and assistance by staff in ministries of health and health care institutions, particularly from those who are responsible for introducing better waste management practices in medical institutions so as to reduce infection risks and improve hygiene. The information provided is of a practical nature. It is based on the outcome of several field projects in the WHO European Region involving schemes to improve health care waste management in hospitals and similar institutions.

The approach described in this document has also benefited from the experience of practical collaboration to improve health care waste management in the WHO Eastern Mediterranean Region through the WHO Centre for Environmental Health Activities, Amman, Jordan.

Further information on more detailed aspects of health care waste management can be found in references (1) to (5).

Getting started

Good management of health care waste in hospitals means the effective segregation of waste and the separate handling and disposal of each segregated waste category. This cannot be achieved without the commitment of senior directors and the motivation of medical and support staff.

The guidance presented here is intended as a starting point for a lasting improvement in waste-related hospital hygiene. The text provides a standard approach that can be followed to introduce the segregation, safe storage and handling of health care waste in medical departments, as well as the separate disposal of each kind of waste so as to minimize as far as practicable the residual health risk.

Improvements in medical areas can only be made quickly if there is a commitment by the directors of a health care institution to deal decisively with the challenge posed by health care wastes. It is essential that they designate staff to be responsible for improving waste

management and that they make available modest extra resources to ensure that these improvements can be maintained. Motivating medical staff, especially nurses and cleaners, is the key to setting up a new waste management system in each medical area.

Ideally, a health care institution should have a working infection control committee with delegated powers to impose changes. The enforcement of better practices in maintaining good hygiene is then exercised by specialist infection control staff, typically highly experienced senior nurses and other medical personnel. Where no formal system for infection control exists, the success of improving health care waste schemes is largely a matter of the determination of the head nurse in each medical department. There are many examples of where this has succeeded, but it is a less reliable approach than is normally achieved through the internal enforcement of infection control by specialist staff.

When a new waste management system is started it is best to begin in two or three medical departments first. Once the system is running and any operational difficulties have been overcome, other medical departments should progressively join in.

If time permits, a waste management plan can be prepared before a new system is put into operation to ensure that the practical arrangements have been properly thought out and the necessary resources have been accurately estimated.

Some health care institutions are under considerable external pressure to improve their waste management since poorly handled, treated and deposited wastes are highly visible and likely to attract the attention of health authorities and the general public. In these cases the tendency is to start introducing improvements, using donated resources such as bins and bags, with only a minimum of forward planning. Once a waste management system is in operation and is seen to be reasonably effective, the management of the institution may be more receptive to making a retrospective waste management plan, in order to define the resources required to sustain the system.

A step-by-step approach for medical departments

Any improvement in the removal of health care waste from patient areas is better than doing nothing. Often it requires no more effort than that used at present. The key is to achieve a change in the way waste is handled and stored in a medical department by introducing a few simple steps.

In a medical department where all health care waste is mixed together and perhaps also stored and removed in a haphazard and unsatisfactory way, an obvious potential for injury and infection exists. Poor standards of hygiene can be reduced significantly by adopting some straightforward steps to segregate the main types of waste, collect and store them properly, and remove them regularly from medical areas.

Step 1. Establish a three-bin system

All waste should be separated by the medical staff into three categories (Photo 2):

- **general health care waste**, usually put into black bags;
- **potentially infectious health care waste** (also known as hazardous health care waste), usually put into yellow bags;
- **used sharps** (including broken glass), put into rigid containers (if possible yellow too).

General health care waste typically includes paper and packaging, drinks containers, glass, food residues, dead flowers, intravenous (IV) bottles, hand towels and tissues, and similar materials not contaminated with body fluids.

Potentially infectious waste is usually all waste items contaminated, or suspected of being contaminated, with body fluids such as bandages and gauze, swabs, IV fluid lines, maternity and incontinence pads and disposable spatulas, bowls and cups. All body parts, human tissue, placentae and blood products should also be regarded as potentially infectious. A separate bag should be used to hold each placenta.

Photo 2. The three-bin waste system:
black bag, yellow bag and sharps container



Source: WHO Centre for Environmental Health Activities, Amman.

Sharps containers should be used to contain needle and syringe assemblies, small ampoules, razor blades, scalpel blades, infusion needles, lancets and broken glass.

More details of typical health care waste items that are placed in black, yellow and sharps containers are given in Table 2.

Step 2. Colour coding

Use distinctly different colours for general and potentially infectious wastes. WHO recommends black for general waste and yellow for potentially infectious wastes. Ultimately all bags, containers, bag holders and trolleys should be either black or yellow to reinforce the separation of these two types of waste. Once separated, the two waste streams should be handled and disposed of separately and not recombined.

Step 3. Transmission routes for infections from health care waste

The most well known transmission route for infections from health care waste is from needle stick injuries caused by sharps contaminated with blood. This is why loose sharp items (e.g. needles and blades) should not be placed in plastic bags or similar containers that are easily punctured.

For other potentially infectious wastes the most probable transmission route is by airborne dispersal of pathogens released from body fluids contaminating the wastes (see Table 1). Therefore, the first simple measure to reduce the risk of airborne transmission is to cover all waste bins and avoid using open containers and wastebaskets.

Table 2. Examples of typical items placed in separate waste containers

Potentially infectious waste bags		General waste bags
Waste materials contaminated or possibly contaminated with body fluids	Used sharps containers	Waste materials not contaminated with body fluids
Gloves, gowns, masks Gauze, dressings, swabs Spatulas Urine, blood bags Sump tubes Suction canisters Disposable bowls and containers used for medical purposes Haemodialysis tubing Intravenous (IV) lines, bags Foley catheters Sanitary napkins Incontinence pads Pre-treated highly infectious waste from medical laboratories, isolation patients Nappies, diapers Human and animal tissue, placentae Body parts (where permitted by local laws and customs)	Needles Needle and syringe assemblies Lancets Scalpels, blades Scissors, sutures Specimen tables Broken glass, ampoules Intravenous catheter Glass slides, cover slips	Packages, boxes, wrappings Newspapers, magazines Disposable plates, cups, utensils Food, food packaging, drinks containers Tissues, paper towels Flowers Intravenous bottles, packs

Source: Adapted from information provided by the King Fahd Hospital in Riyadh (Saudi Arabia) and the WHO Humanitarian Assistance Office in Pristina, Kosovo (Federal Republic of Yugoslavia).

Step 4. Different locations for black and yellow waste bags

To reinforce the importance of separating waste in medical departments, the yellow and black waste bags should be located in separate places. One, or no more than two, yellow bags should be in use at any time in most medical departments. They should be located away from patient areas and usually at the nurses' station or room and (if one exists) possibly in a treatment room. Sharps containers should be in the same locations and not in the patients' areas where they could be interfered with.

Step 5. Fixed collection schedule

There should be a fixed schedule for the collection of waste bags and containers from each medical department. This is to ensure the regular removal of waste from each location and to avoid misunderstandings between medical staff and cleaning or housekeeping staff. The minimum frequency of waste removal should be once a day, and preferably at least once per working shift. There should be separate schedules and separate collection times for black bags and yellow bags/sharps containers.

Step 6. Bag filling

No bag or sharps container should be more than three quarters full when it is replaced. It should preferably be replaced when it reaches two thirds full. The reason for this is to reduce the risk of plastic bags splitting open and of an injury from a protruding sharp item in sharps containers.

Step 7. Bag closing and labelling

All bags leaving a medical area should be sealed and labelled (Photo 3). The label should show, as a minimum, the name of the responsible medical person from the medical area (usually the head or charge nurse), the date and department name.

This labelling is to enable managers and other personnel to trace any waste bag to its source if a problem is found (e.g. used sharps are

contained in a bag or general and potentially infectious wastes are mixed in the wrong bags). It also allows medical managers to gather data on the amount of waste produced in each medical department and so ensure that the typical quantities of each waste type do not suddenly change.

Photo 3. All waste bags when filled should be sealed and labelled before leaving a medical area



Source: WHO Centre for Environmental Health Activities, Amman.

Step 8. Temporary storage

In medical areas producing a high quantity of waste, bags can be filled reasonably quickly. The use of rigid containers such as a two-wheeled 240-litre container with a lid is recommended for temporary storage within or near to these areas. Sealed and labelled yellow bags containing waste are placed in this container and then removed at the scheduled collection times by cleaning or housekeeping staff. The use of a rigid container as a temporary storage point avoids filled waste bags being piled on the floor where they could be knocked and split open. One yellow temporary storage container should be available to each medical department for potentially infectious waste. Sometimes more than one medical department on the same floor can share this temporary storage point. The temporary storage point should be located away from patient areas, for example in a sluice room or housekeeping room.

A separate rigid container, preferably black, can be used as a temporary storage point for general waste (Photo 4).

Photo 4. Two-wheeled trolley for transporting sealed waste bags which can also be used as a temporary storage container for sealed waste bags in a medical area



Source: WHO European Centre for Environment and Health, Rome Division.

Some hospitals do not use temporary storage. Instead, medical, cleaning or housekeeping staff transport sealed bags of waste directly from a medical area to a central storage point outside the building.

Step 9. Sharps containers

A sharps container should be labelled “SHARPS” in the relevant language to remind medical staff what it contains.

When filled to no more than three quarters full, a sharps container should be sealed and sent for disposal with potentially infectious waste. To ensure that this disposal route is used, some hospitals require sealed sharps containers to be placed into yellow bags, tied and placed in the

yellow temporary storage container (if used) or taken to the central storage area for potentially infectious waste.

Step 10. Trolleys and bag holders

To reinforce the use of a colour coding system, all bag holders, pedal bins and waste transporting trolleys should be either black or yellow. Where this is not possible, clear signs should be placed on the bag holders, bins and trolleys to indicate whether they should be used for general waste or infectious waste.

Step 11. Internal transport

If waste bags are carried out of the building to a central storage area in trolleys touring different medical departments, separate trolleys should be used for general waste and potentially infectious waste (Photo 5). Yellow and black bags should not be carried mixed in the same trolley. If both types of bag are carried this increases the possibility of wastes becoming mixed and being transported along inappropriate disposal routes.

Photo 5. Four-wheeled trolley for transporting sealed waste bags: the top cover is open



Source: WHO European Centre for Environment and Health, Rome Division.

The use of closed trolleys with lids is recommended. **Waste bags should not be hand-carried around a hospital since this increases the risk of injury to the legs, arms and torso from incorrectly disposed of sharps or other items.**

Step 12. Central storage points

These are locations in special areas or in the grounds of a hospital where larger containers, e.g. 1.1 m³ four-wheeled bins (eurobins), are used to store waste until it goes for final disposal either on- or off-site (Photo 6). To ensure that waste is kept separated, the central storage containers for black bags should be black or at least clearly marked “for general waste only”.

Photo 6. Central waste storage points outside medical buildings: moulded plastic or sheet metal 1.1 m³ “eurobins” fitted with a cover (separate locations and colours should be used for the storage of sealed bags of general and infectious waste)



Source: WHO European Centre for Environment and Health, Rome Division.

Similarly, the central storage containers for yellow bags should be yellow or at least clearly marked “for infectious waste only”.

There may be one or more central storage points for yellow and black bags depending on the layout and size of each hospital. The central storage point(s) for the two types of waste should be geographically separate at a hospital site. Waste from the separate central storage points for general waste and potentially infectious waste should go to different final disposal facilities.

In hot, arid and tropical areas all waste should be disposed of within 24 hours in the hot season and a maximum of 48 hours in the cool season. Therefore, the storage time at a central storage point should be short.

In temperate climates, WHO suggests that all waste should be disposed of within a maximum of 72 hours (in winter), although recent experience has shown that a maximum period of 48 hours is more desirable in case of occasional unforeseen delays. These time periods assume that central storage points are not refrigerated.

Step 13. Highly infectious waste

Some medical areas produce health care waste that it is reasonable to suspect could be contaminated with highly contagious pathogens. Such sources include: all laboratory samples containing body fluids, tissues or faecal stools; isolation patients; and medical research facilities handling class 3 or higher pathogens. Waste from these sources should be autoclaved first (or possibly chemically disinfected) and then placed into yellow bags before entering the system for disposing of potentially infectious waste in the hospital.

In some places highly infectious waste is not pre-treated by autoclaving or disinfecting. Instead, it is taken directly to an on-site incinerator and burnt immediately. This is not recommended because severe problems may occur if a bag of un-pretreated highly infectious waste splits while it is being transported around a hospital.

More details on handling highly infectious waste are given in Table 3.

Table 3. Checklist for handling and collecting highly infectious waste

Segregation

Highly infectious waste should be:

- kept in the medical area until it is pretreated
- segregated from other general and potentially infectious waste
- placed immediately into a leak-proof bag or container.

Pre-treatment

Highly infectious waste should be immediately disinfected (e.g. autoclaved or chemically treated) before becoming mixed with hazardous health care waste from other medical departments.

Packaging

Highly infectious waste should be packaged in yellow bags, preferably with the biohazard symbol, and clearly marked with the words "HIGHLY INFECTIOUS WASTE", with a comment on whether or not it has been pretreated.

Labelling

Yellow bags should be labelled with the: name of the institution, name of department/waste generation area, type of waste, name and signature of person sealing the bag/container and date it is sealed.

Storage and internal transport

Disinfected highly infectious waste packaged in yellow bags is no longer regarded as highly infectious and can therefore leave the medical area with other yellow-bagged waste, stored and transported.

Yellow bags containing non-disinfected highly infectious waste (in case of outbreaks or failure of the disinfection equipment) should be:

- collected quickly from a temporary storage area connected to the infected patient area and carried to a single, secure central storage area; on no account should collected waste be left anywhere other than the central storage point;
- carefully loaded onto a suitable wheeled trolley: this should preferably be high-sided to prevent bags falling off, free of sharp edges that could damage the bags, and of a stable four-wheeled design; it should not be used for any purpose other than the transportation of potentially infectious health care waste, and it should be disinfected periodically.

Spillages of waste (disinfected/non-disinfected) while in transport should be picked up by staff using protective clothing and placed into another yellow bag and labelled. The area should be disinfected thoroughly.

Sources: WHO Centre for Environmental Health Activities, Amman, and (2).

Step 14. Other hazardous health care waste

The information presented in this report refers only to the two categories yielding the largest quantities of hazardous health care waste in medical institutions: sharps and potentially infectious waste items. Five other types of hazardous health care waste can also be found in medical institutions: pathological (including anatomical) remains; chemicals; pharmaceuticals (including cytotoxics); radioactive materials; and pressurized cylinders. This document does not cover the measures necessary for their safe disposal. More details on their handling and disposal will be found in (2) and in forthcoming booklets in this Health Care Waste Practical Information Series.

Step 15. Training

The waste management system in a hospital should be clearly set out in a waste management plan. An infection control or hygiene committee and specialist infection control personnel, where they exist, are the most appropriate people to be given responsibility for establishing a safe approach to the management of health care waste throughout a health care institution.

In addition, in every medical department someone should be responsible for ensuring good waste management procedures at every stage from generation to final disposal of health care waste. It should be regarded as the professional responsibility of all medical staff to use a waste segregation system and to dispose of waste properly, since it is part of the continuing need to maintain good hygiene within hospitals to control infection.

Every new member of staff should be trained in his or her responsibilities with regard to achieving good waste management in their area. If a person is not shown what to do, the hospital management cannot expect him or her to do it properly. If, after being shown the procedures, a member of staff fails to observe the correct methods for handling waste, it should become a management or disciplinary matter.

Good waste segregation and hygienic practices require constant reinforcement. Staff can be reminded in various ways, such as training on recruitment, short refresher training courses and workshops in the department, posters and signs, hygiene inspections, staff newsletters and information literature.

References and further reading

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The poor management of health care waste in medical institutions is an obvious risk and potential source of hospital-acquired infection. This booklet provides detailed step-by-step guidance on setting up an effective system of separating waste from patients and ensuring that different kinds of waste are kept segregated for appropriate handling, treatment and disposal. It is based on practical experience gained during the implementation of health care waste improvement projects over the past five years in the WHO European and Eastern Mediterranean Regions. The advice given is consistent with other recent guidance on health care waste management issued by WHO headquarters in Geneva and the Regional Office for Europe. In particular, the advice and methods presented here draw on knowledge accumulated in WHO to provide practical guidance to anybody starting, or re-starting, an organized system of health care waste management in an institution.

This booklet concentrates on improving the management of general, sharps and potentially infectious health care waste, including the types of waste believed to exhibit the highest risks of infection. The booklet is intended to be the first in a series offering practical information on the management of health care waste to health care institutions. Subsequent booklets in this series will provide similar guidance on the handling and management of other types of health care waste.